FRD Activities Report
March 2004

Research Programs

CBLAST-High

Processing of winds and temperature data collected during last year's hurricane season have been completed and made available to the CBLAST community. Fluxes were calculated from four of the six hurricane flights. Measurements from the remaining two flights (FLT 2 and 3) were unuseable because of problems with water in the BAT probe ports.

At present, we are focusing on estimating surface flux of sensible heat and momentum from the BAT data. We are also working with Will Drennan from RSMAS (Univ. Miami) to estimate latent heat fluxes by combining BAT measurements with measurements from a modified LICOR 7500 mounted inside the nose of the NOAA P3. These data will be presented for the first time at the upcoming AMS Hurricane and Tropical Storm Conference in Miami in May.

Preparations continue for this year's upcoming hurricane season. A new sensor board for the BAT was fabricated to replace the board that was damaged by water last year. Some erosion of the cone was noted after last year's flights. An aluminum ring is being manufactured that will be mounted on the front edge of the BAT cone to protect it from the impact of water in hurricane flights. The BAT is scheduled to be re-installed on N43RF in late May. Test flights will occur in early June and again in August. (Jeff.French@noaa.gov)

ET Probe

One of the ET probes at FRD was modified in March in an attempt to reduce problems with water entering the pressure ports and affecting the pressure data. All the ports were enlarged to 6.4 mm in diameter, and larger-diameter plastic tubing was used inside the sphere. This tubing is routed upward to the top of the sphere in the hope that gravity will assist in keeping the tubes from getting fouled by water. The new design was tested by mounting it on a pickup truck next to a 3D sonic anemometer. Preliminary road tests in dry conditions indicate that the ET probe closely matches the sonic data; the enlarged holes do not appear to have affected the probe's performance. Idaho does not get many rainy days, so the probe was tested for wet conditions by spraying it with a garden hose and then driving the truck. When the water spray was hitting the probe, a large number of spikes showed up in the pressure data. These spikes are very sharp and may be relatively easy to eliminate in the data processing. Once the truck was in motion, the wet ET probe appeared to be still providing reasonable mean horizontal winds, but there was a lot of noise in the data affecting the turbulence quantities. Some of this noise was periodic in nature, with a frequency of about 4 Hz. One theory is that water drops are sloshing back and forth inside

some of the tubes and creating a pressure signal. Further modifications are already planned to help in reducing this noise. (Richard.Eckman@noaa.gov, Tom Strong)

Pentagon Shield

A small atmospheric tracer study at the Pentagon has now expanded into a large study that will involve 8 of our 10 real-time SF_6 analyzers and all 100 of our bag samplers. The study now includes an indoor component that will use real-time analyzers and bag samplers. The changes in scope occurred with very short lead time. This has required FRD staff to increase the focus on preparations. We are on schedule and the deployment will be May 1-10. (Kirk Clawson & staff)

Preparations for the Pentagon Shield project were begun. We are conditioning the SF_6 continuous analyzers, completing repairs, and testing subsystems. We have constructed customized lab carts to deploy the analyzers inside the Pentagon. Gas Lab personnel are testing the Programmable Integrating Gas Samplers (PIGS) and conducting an aging study to verify that the samples will not be compromised during shipping from Washington, D.C. to Idaho. Cartridge cleaning will begin early next month. We have completed a review of regulatory requirements for operation of the TGAs at the Pentagon and are in compliance. Planning for the project has been challenging because of changing requirements and a tight schedule but preparations are proceeding smoothly. (Roger.Carter@noaa.gov, Debbie Lacroix)

Smart Balloon

Full funding for this project has been restored after being completely cut early in March. We continued testing of the balloon transponder hardware and software and making changes to the communications software to convert from the Globalstar to the Iridium satellite system. UNH is now testing the ozone sensor. This sensor will be incorporated into the transponder package. (randy.johnson@noaa.gov)

Proteus Aircraft

Work began on the fabrication of a BAT probe for the Proteus aircraft (http://www.scaled.com/projects/proteus/proteus.htm). The BAT will provide turbulence and up/down draught measurements from Proteus near the top of the troposphere. These measurements will provide a means to investigate relationships between vertical velocity, ice super-saturations, and crystal habit and growth in cirrus clouds. Such measurements are critical for the advancement of our understanding of the role of cirrus clouds in radiation balance. Installation and flight testing of the BAT on Proteus is tentatively scheduled for mid-summer with the first deployment in fall 2004. (Jeff.French@noaa.gov)

Cooperative Research with INEEL

Emergency Operations Center (EOC)

A training exercise was held in mid-March to explore scenarios for potential emergencies at the

INEEL. FRD participated by providing explanations of the type of meteorological support that would be available and by supplying examples of meteorological conditions that could be expected in different seasons and depending on the time of day, etc. (Jeff.French@noaa.gov)

INEEL Support

Last year an INEEL dispersion study was completed based on nine years of data from the Mesonet operated by FRD. The work was published as a NOAA Technical Memorandum (OAR ARL-246). Although this study had a relatively narrow focus for INEEL emergency planning, there are some aspects of the work related to probability theory and dispersion that may have broader application. Hence, the outcome of the study is being reviewed to determine whether parts of it can be adapted for journal publication, possibly in *Atmospheric Environment* or the *Journal of Applied Meteorology*. This may require some extensions of the original study. (Richard.Eckman@noaa.gov)

Other Activities

Outreach

Three FRD scientists presented an educational scientific lecture and demonstration program on density and weather to eighth grade students from Ririe Middle School. They also discussed the nature of their jobs and the education and experience that have led them to their careers. This program can be adapted for other grade levels. (tom.watson@noaa.gov)

Travel

Kirk Clawson, March 1-2, to Boulder, Colorado, for Pentagon Shield Project planning meeting.

Kirk Clawson, March 8-10, to Washington, D. C., for Pentagon Shield Project planning meeting and project site survey.